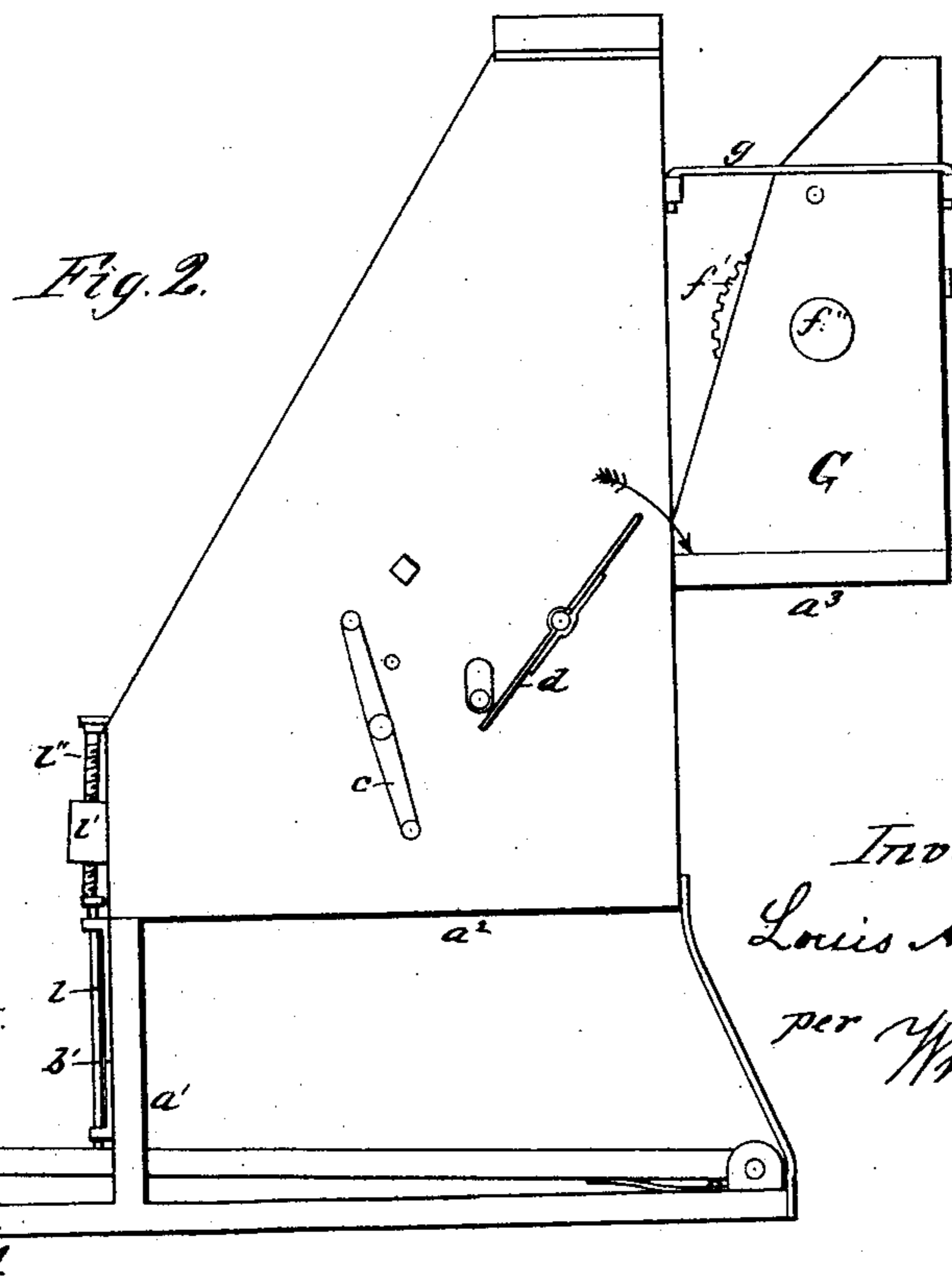
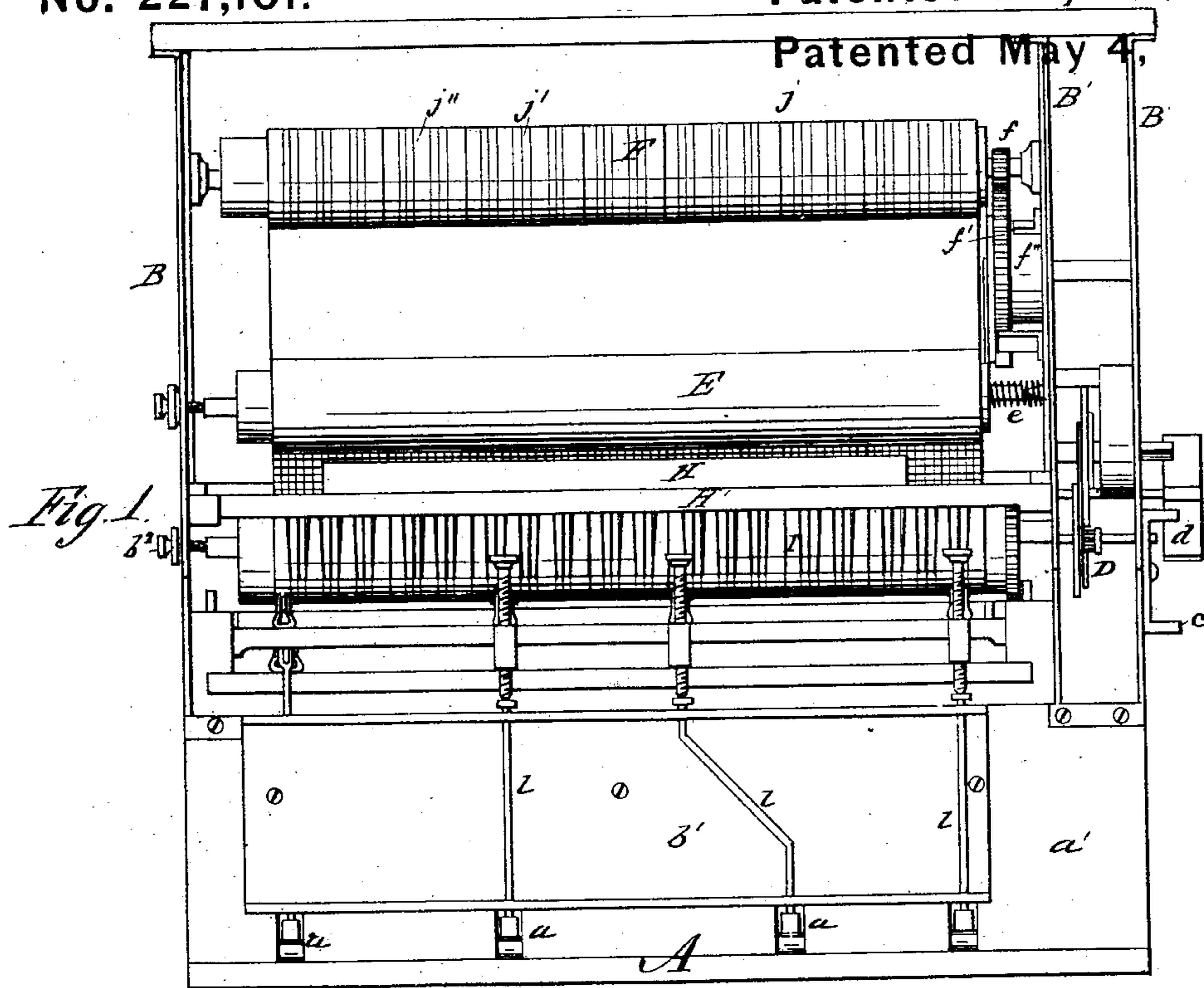


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Music-Recording Attachment for Keyed Instruments.  
No. 227,101. Patented May 4, 1880.

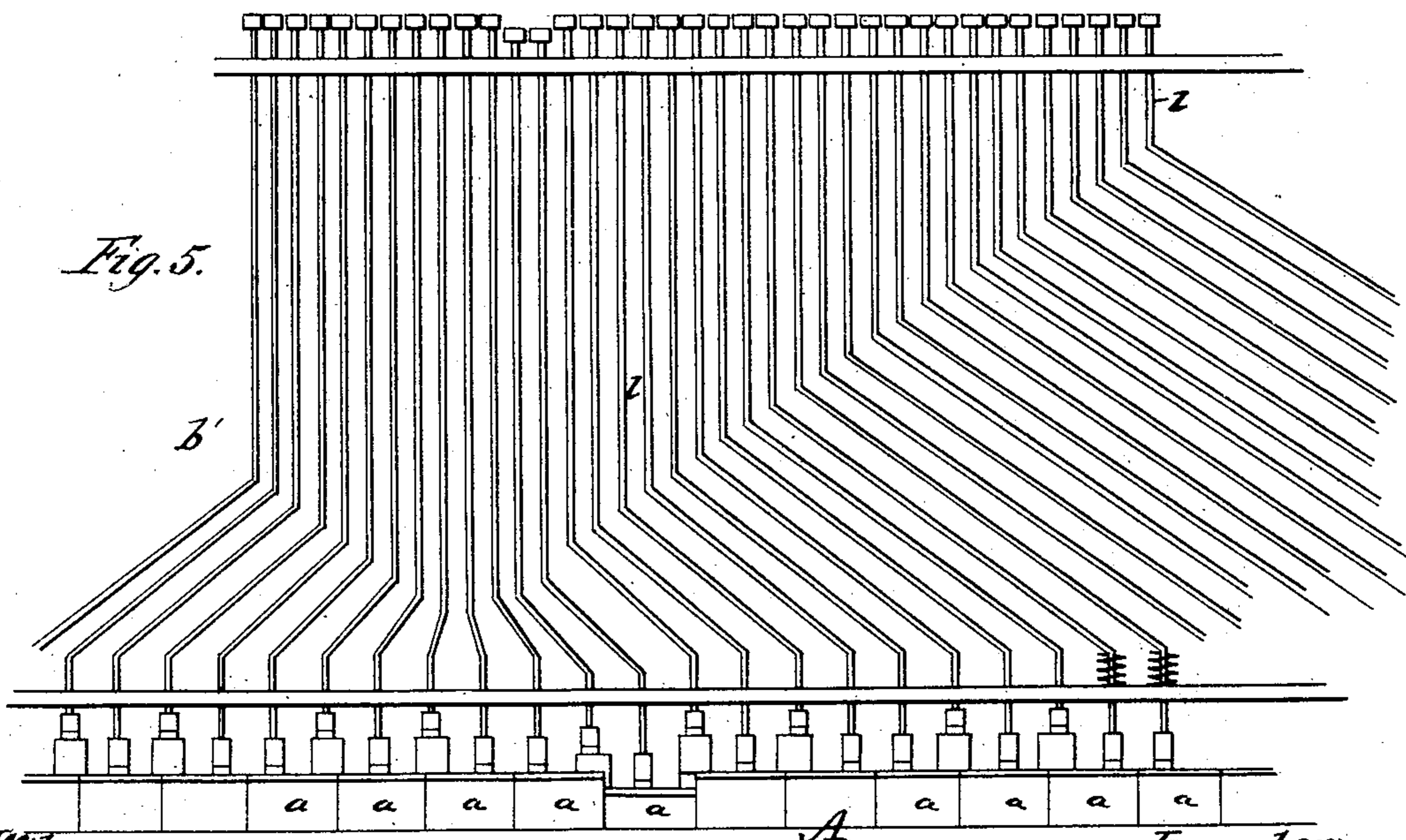
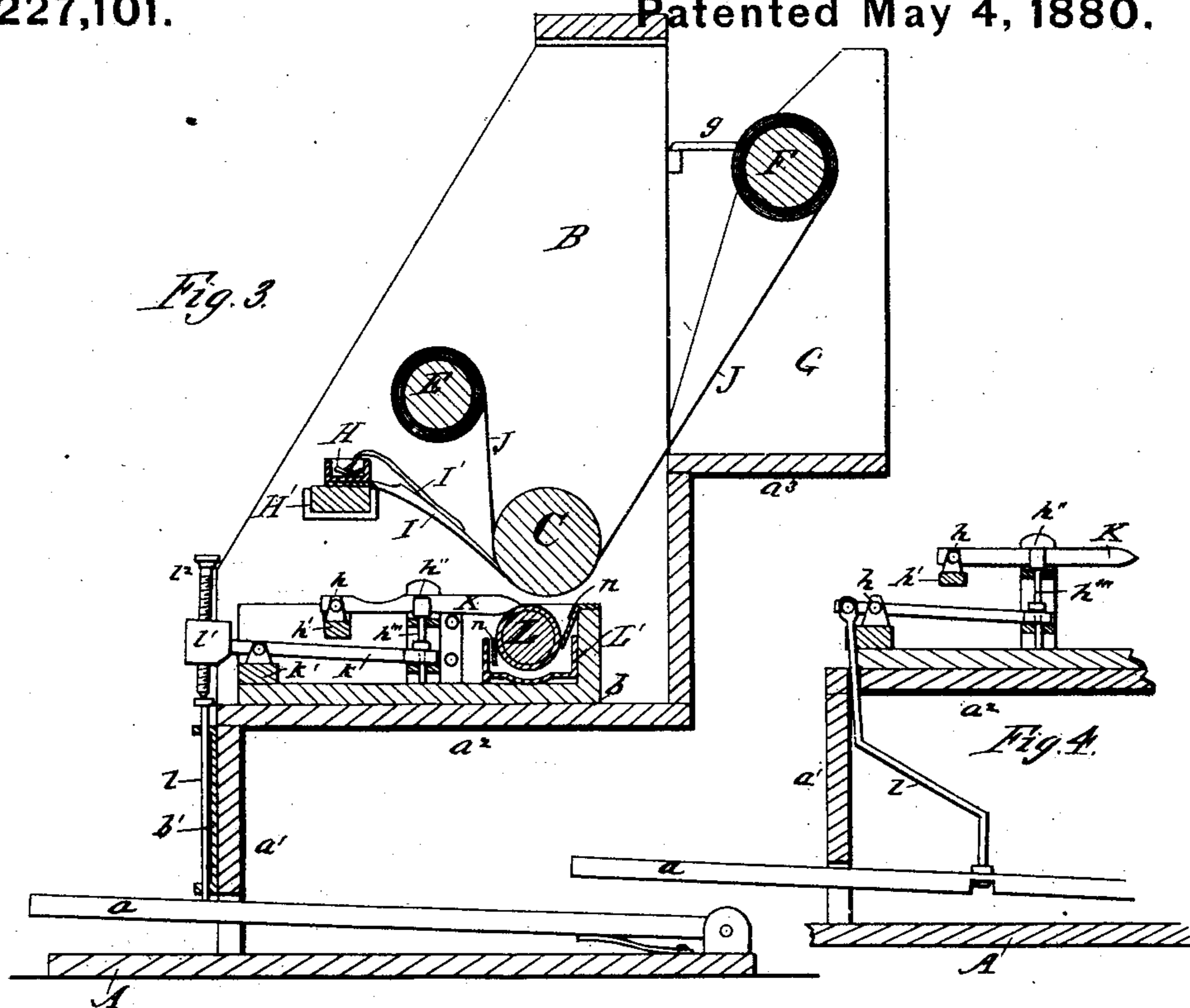


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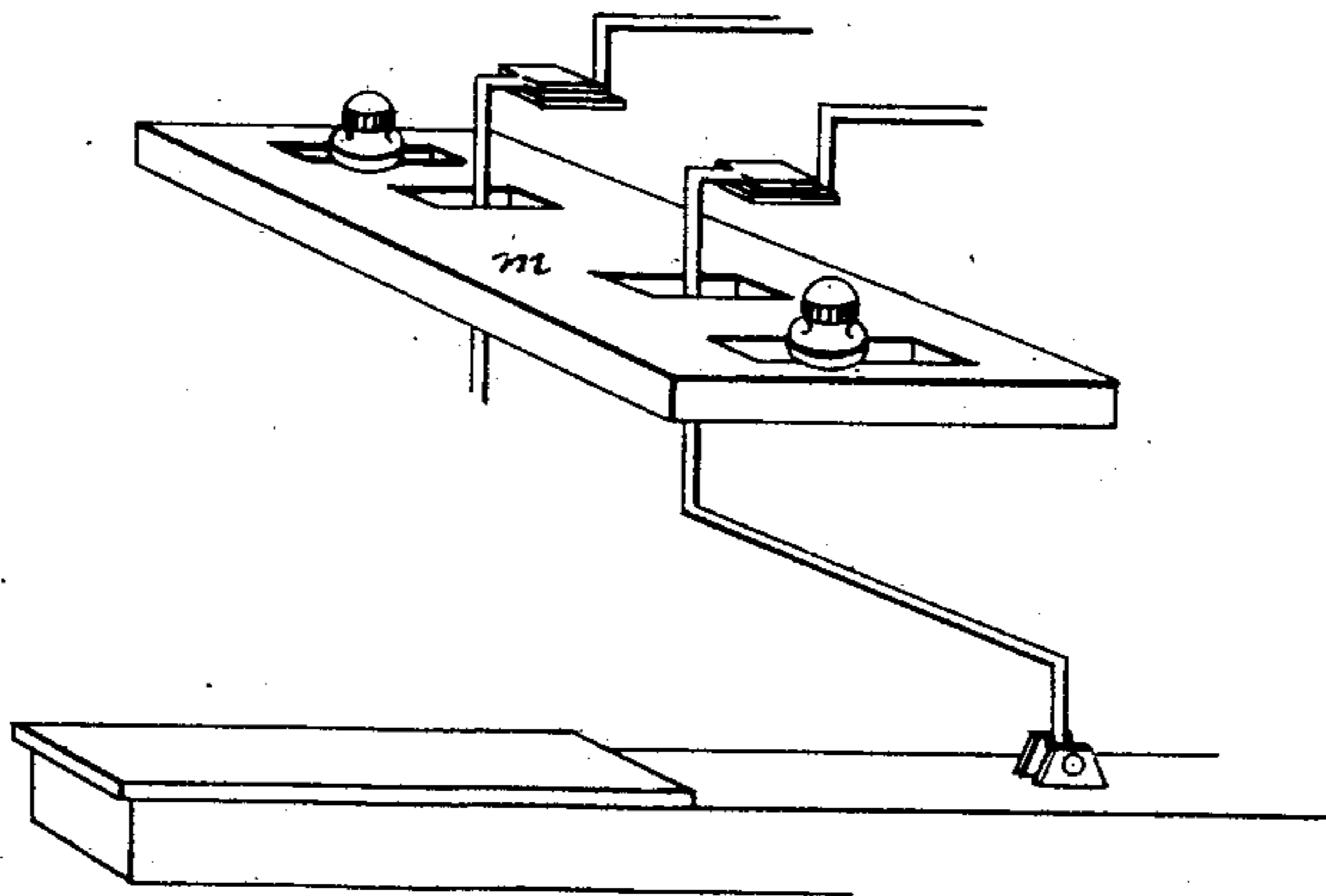


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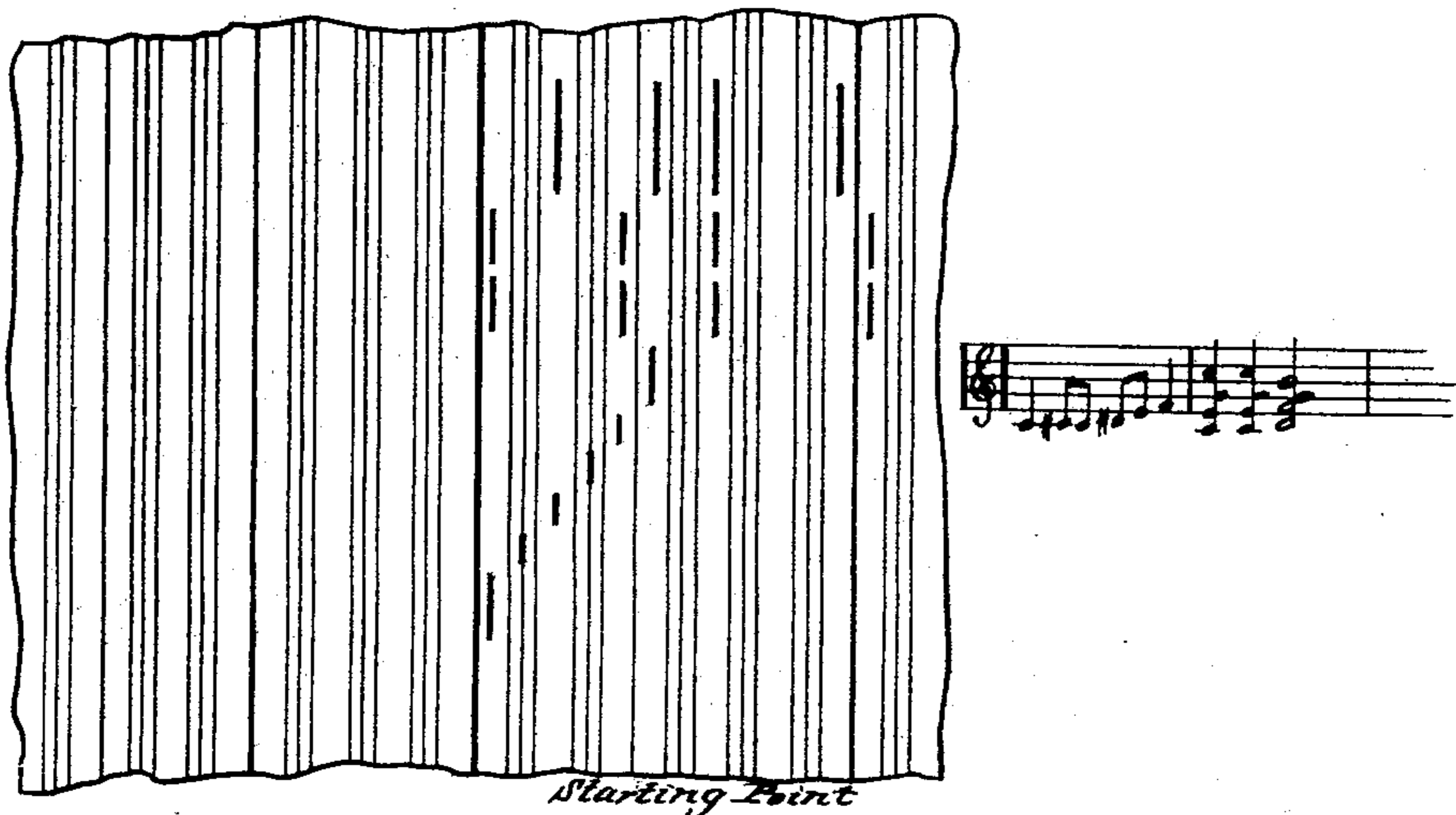
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*Fig. 6.*



*Fig. 7.*



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# UNITED STATES PATENT OFFICE.

LOUIS A. FERNOW, OF CHICAGO, ILLINOIS.

## MUSIC-RECORDING ATTACHMENT FOR KEYED INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 227,101, dated May 4, 1880.

Application filed January 31, 1880.

*To all whom it may concern:*

Be it known that I, LOUIS A. FERNOW, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful  
5 Improvements in Music-Recording Attachments for Keyed Instruments, of which the following is a specification.

This invention relates to an apparatus especially intended to aid composers of music, for  
10 writing down the improvisations of a pianist or organist, or for recording music, however executed, at the time that it is played upon an organ or piano.

The apparatus is designed to be removably  
15 attached to a piano or organ over the key-board, and to operate in connection with vertically-guided rods resting upon or connected with the keys, which transmit the movement of the keys to recording pens or points vibrat-  
20 ing below a strip of paper, cloth, or other equivalent material, upon which the record is marked. This strip of paper or other material is moved forward by a clock-work, and during its movement is longitudinally ruled with dividing-lines,  
25 which represent the keys in their successive order. By depressing a key its recording pen or point is raised and is pressed against the moving paper, where it will mark a dot or a line, according to the length of time the said  
30 key is held down, a short touch being represented by a single dot, while a longer note will be recorded by a more prolonged line.

My invention therein consists in the manner of ruling the paper or other record-receiving  
35 material to represent the keys and octaves, and in the several combinations of the parts of my apparatus, as fully pointed out by the claims.

In the accompanying drawings, forming a  
40 part hereof, Figure 1 represents a front elevation of my recording attachment, showing, for clearness, the wire connection of a few keys only. Fig. 2 is an end elevation of the same. Fig. 3 is a transverse vertical section through  
45 the central portion of the device. Fig. 4 is a similar section through a part of the apparatus, showing a modified form of the wire connection with the keys, the same being made within the piano-casing. Fig. 5 is a front elevation, show-  
50 ing the arrangement of the several rods for transmitting motion from the keys to the recording-pens; Fig. 6, a view, in perspective, show-

ing a method of disconnecting, by a single movement, the key-wires when connected to the keys within the piano-casing, from the levers  
55 which vibrate the recording-pens; and Fig. 7, a view of a portion of the strip of paper ruled by my apparatus and having the record of notes played on the instrument.

Like letters denote corresponding parts in  
60 the several figures of the drawings.

A is the key-board of a piano, having the usual keys *a*. *a'* is the front board of the piano-casing. *a''* is the top board, upon which usu-  
65 ally the note-rack is secured; and *a'''* is the cover, shown as thrown open.

The frame of the recording attachment may be made of any suitable construction to inclose the parts and to permit of their removal and  
70 adjustment. It is intended to be tastefully ornamented, and has an inclined front, which may be closed, and will, at the same time, form a note-rack for holding sheet-music. This frame is shown as composed of three uprights, B B' B'', secured upon a base-board, *b*, which, when  
75 the attachment is placed upon the piano, takes the place of the base-board of the note-rack, which is first removed.

To the front edge of the base-board *b* is se-  
80 cured a vertical board, *b'*, which hangs down against and in front of the front board, *a'*, of the piano-casing nearly to the keys.

The uprights B B' B'' are connected at their top by a cross-strip, and the front of the up-  
85 rights is covered by a hinged or removable lid to give access to the parts.

C is a roller removably journaled between the uprights B B', and rotated at a uniform speed by a clock-work, D, of any usual or suit-  
90 able construction, which is arranged between the uprights B' B'', and is driven by one or more springs or weights.

The shaft of the roller C has a square socket at one end, which couples with the squared end of the driving-shaft of the clock-movement,  
95 and at its other end it is held by a pointed screw and holding-nut, *b''*, Fig. 1, so that said roller can be readily removed to take out or put in the strip of paper or to adjust any of the parts of the apparatus. This roller C may  
100 be covered with cloth or rubber to increase the friction on the paper strip.

The clock-movement is regulated by a fan, *d*, located outside of the frame, which I pro-

pose to construct with adjustable wings, so that a slower or faster motion can be given to the feed-roller C, according to the time and character of the music played, whether the movement be fast or slow.

A pivoted stop-arm, *c*, within easy reach of the player, can be thrown into and out of the path of movement of the fan-arms, so as to stop or start the clock-work instantly.

E is a roller, which carries the roll of paper, cloth, or other material upon which the record is to be marked, and which is removably journaled on points in the frame, one of which points is a thumb-screw like that for holding the roller C. This roller E has a tension-spring, *e*, at one end to give the proper tension to the strip of paper.

The paper as it unwinds from the roller E passes downwardly under the roller C, and then upwardly to another roller, F, upon which it is wound in a roll. The roller F is removably journaled in a separate frame, G, placed anywhere upon the cover of the piano, and removably connected to the frame of the main attachment by rods *g*, having hooked ends, which enter eyes on the two frames and hold them rigidly a fixed distance apart.

The roller F is provided with a pinion, *f*, on its spindle near one end, which engages with a gear-wheel, *f'*, turned in one direction by a spring, *f''*. This spring is tightened by a thumb-winding knob, *f'''*, on one side of the frame G, and it turns the roller F so that the same will take up the paper as it is fed along and will maintain a proper tension of the same.

H is an ink-trough secured upon a cross-bar, H', which is removably held between the uprights B B' by being dropped into stirrups on the same. To the inner side of this bar are attached a row of ruling-pens, I, of any suitable construction, which are supplied with ink by a strip of cloth, I', placed in the ink-trough and extending over the edge of the same to the pens. These ruling-pens may be hinged to the cross-bar H', and be connected by suitable devices with the stop-arm *c*, so that their points will be removed from the paper at the same time that the clock-work is stopped, and will be pushed into contact with the paper when the clock-work is started, to prevent the blotting of the paper. These ruling-pens I are arranged side by side, so as to rule the paper with parallel lines as it moves between their points and the feed-roller C. This ruling may represent in any suitable way the different keys; but I prefer to designate the keys and the octaves in the manner shown in Fig. 7.

The strip J of paper, cloth, or other suitable material I make about the width of the ordinary music-sheet, and it contains within that width representations of all the keys and octaves of the instrument. The octaves are marked off by heavy lines *j*. The black or semi-toned keys are denoted by groups *j'* of lighter lines, and the white keys or whole tones

are shown by the blank spaces *j''*. The paper is also represented as having the record of two measures of music played upon the instrument, which can be reproduced from the strip or transferred to the ordinary staff, as shown.

The pens I rule the paper directly above the recording-pens and against the surface of the same roller, and any lateral or uneven movement of the paper affects alike the key-lines as well as the note dots or lines, so that the paper will always show correctly what keys have been played. If the paper, however, were ruled before being placed in the apparatus, any unevenness in its movement would injure or destroy the correctness of the record.

K are the recording-pens, one for each key of the piano or organ, which are pivoted at the ends of their shanks in saddles *h*, having studs setting removably in holes in a cross-bar, *h'*, which is removably held in slots of the frame, so that each pen can be removed without disturbing any of the others, or all the pens can be taken out at the same time. These pens K extend from the saddles *h* rearwardly to the inking-roller, and rest loosely at about their centers in saddles *h''*, having pins *h'''*, which pass downwardly through two removable bars, *i i'*. The pins *h'''* between such bars have shoulders or buttons, which rest on the forked ends of levers *k*, pivoted to removable saddles (like the saddles *h*) on a bar, *k'*, which is removably held in the frame by horizontal slots near the front edge of the base-board *b*.

Wire rods *l* are situated vertically against the board *b'*, pass through flanges on the top and bottom edges of such board, and rest at their lower ends on the keys. These wire rods support at their upper ends the outer arms of the levers *k*, which have weights *l'*, for moving the levers and rods when the keys are depressed, and adjusting-screws *l''*, for regulating the movement of the levers *k*.

The rods *l* are bent, as shown in Fig. 5, toward the center of the key-board, so that all the keys of the piano will be condensed on the record-strip to about the width of the ordinary music-sheet.

The outer and longer wire rods will be more liable to spring than those nearer the center, and may, if desired, be made of heavier wire.

To make the pressure on the keys nearly alike, the outer wire rods can be partially supported by graduated spiral springs, two of which are shown on one side of Fig. 5.

It is intended that the wire rods shall not follow the keys all the way down, but only far enough to give sufficient movement to the levers *k*, so that when the hand is raised from the keys the impetus gained by them before reaching the ends of the wire rods will bring them back to their proper level.

The rods *l*, being carried by the hanging board *b'*, will be removed with the attachment when the same is lifted from the piano, as it may be at any time; but, if desired, the hanging board *b'* can be dispensed with, and the

rods *l* positively connected to the keys within the casing of the piano, as shown in Figs. 4 and 6.

In Fig. 6 is shown a method of readily disconnecting the levers of the recording attachment from the wire rods when the same are positively connected with the keys.

The attachment of the rods to the keys is made by loose joints or turning joints of any kind. The rods have hooks at their upper ends, which engage with the hooked ends of the levers, and a slotted sliding plate, *m*, is placed on the piano-casing, by moving which plate the wire rods can be connected or disconnected simultaneously with the levers *k*. This sliding plate *m* would be covered by the note-rack when the same is in position, its base-board being cut away on its under side for that purpose.

The recording-pens rest at their marking ends when the keys are not depressed upon an inking-roller, *L*. This roller is connected by gear-wheels with the roller *C*, so as to be turned thereby in the opposite direction. It runs in an ink-trough, *L'*, which has strips *n*, of metal tipped with cloth, to protect the ink from dust, distribute the same evenly upon the roller, and prevent the spilling of the ink when the apparatus is moved.

A blotting-roller may be provided to dry the ink before the paper is rolled upon the roller *F*, or a sheet of ink-absorbing paper could be wound from a roller between the layers of the record-strip.

All the striking and working parts of the apparatus are, where possible, to be cushioned and made to work without noise, and the entire frame is to be lined with flannel or other cloth to deaden any sound.

When a musician wishes to record the piece he is playing, he adjusts the regulating-fan, if not already in proper adjustment, and moves the stop-arm out of connection with it. The clock-work then operates and turns the feed-roller *C*, which moves the paper. The music as it is played is marked upon the progressing paper, which forms a permanent record, from which the music can be reproduced upon the piano or organ, or can be converted into the usual sheet-music. If the front of the attachment is opened, the operator can ascertain, by looking at the paper as it winds upon the roller *F*, whether the pens are recording and ruling or not.

At any time the musician can stop the clock-work by simply moving the stop-arm.

Instead of the vibrating recording-pens, vibrating perforating-points could be used, which would perforate instead of mark the paper; or both the recording and ruling pens could be replaced by points which would mark the surface of a chemically-prepared paper.

Having thus fully described my apparatus and explained some of its advantages, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a music-recording attachment for keyed instruments, the record-strip *J*, ruled longitudinally with lines to distinguish the octaves and to denote the black and white keys, substantially as described and shown.

2. In a recording attachment for keyed musical instruments, the combination, with the record-sheet moved by clock-work, of the recording-pens operated by a lever-connection with the keys and the ruling-pens marking the sheet on the same roller as the recording-pens, substantially as described and shown.

3. In a recording attachment for keyed musical instruments, the combination, with the sheet of paper moved by clock-work, of the inking-roller and the recording-pens operated by the movement of the keys and arranged to vibrate between the inking-roller and the progressing paper, substantially as described and shown.

4. In a recording attachment for keyed musical instruments, the combination of the recording-paper wound from a supply-roller upon a receiving-roller with an intermediate feeding-roller turned by clock-work, the inking-roller, and the recording-pens vibrated by the keys between the inking-roller and the feed-roller, substantially as described and shown.

5. In a recording attachment for keyed musical instruments, the combination, with the rods and levers for operating the recording-pens from the keys, of the weights and adjusting-screws, substantially as described and shown, for the purpose set forth.

6. In a recording attachment for keyed musical instruments, the combination, with the recording-pens and the levers for operating them, of the rods *l*, supported by the keys and bent toward the center of the key-board, substantially as described and shown.

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